The Potential of Renewable Energy Technologies in Wisconsin: Customer Sited Commercial Wind

Notes from Meeting: February 23, 2005
(12:00 PM – 2:30 PM)

A draft narrative document providing background material about customer sited commercial wind was distributed by e-mail prior to the meeting. *Portions of this narrative are included and appear in italics.* The following meeting notes are organized around the Discussion Outline distributed at the meetings.

Attendees

Larry Krom, L&S Technical Associates (Focus on Energy Renewable Energy Program)
Barbara Samuel, WI DOA Division of Energy
John Ness, Xcel Energy
Paul Helgeson, PSCW
Carl Siegrist, WeEnergies
Laura Williams, MGE
Eric Kostecki, Alliant Energy WPL
Don Wichert, WECC (Focus on Energy Renewable Energy Program)
Ingrid Kelley, ECW

Resource Characterization: Customer Sited, Commercial Wind Energy

Wind turbines in Wisconsin generated 103.8 million kWh of electricity in 2003. This includes power from utility wind farms and small systems owned by individuals. While wind power currently provides only a tiny portion of the state's power needs, growth in the wind industry increased 122 percent since 2000.[1] A number of new utility projects currently being planned will further expand the capacity.

It has proven very difficult to estimate wind speeds in Wisconsin, except by monitoring specific locations. According to the U.S. DOE EERE State Wind web site, "Wisconsin has good wind resources in portions of the state."[2] EERE estimates that about 0.4% of Wisconsin land (more than 140,000 acres) is both available and has a wind resource of class 4 or higher. According to another analysis, Wisconsin's wind resource ranges up to about 16.5 miles per hour at 60 meters or 197 feet, with the greatest potential available in the central portion of eastern Wisconsin. (Include Wisconsin Wind Energy Potential map produced by WDOA Energy Division). Data for this map was gathered from over a dozen wind monitoring locations, including several in adjoining states, which measured wind speeds at heights up to 60 meters. Besides these two maps with their estimates, previous efforts have yielded different pictures. Any map illustrates only an estimate of wind speeds. Individual sites must still be analyzed because topography and other factors

[1] Wisconsin Energy Statistics 2004
[2] www.eere.energy.gov/state_energy/tech_wind.cfm?state=WI

can influence the local wind energy potential. In addition, even sites not located in "good" wind resource areas indicated on the map may still have the potential to economically produce wind energy.

Until recently, wind energy development in Wisconsin has focused on utility-scale wind farms and small systems sized under 20kW, usually installed in rural residential settings and eligible for net metering. A new mid-range wind energy market is now showing promise. Remanufactured utility turbines in the 35-90 kW range are attracting the attention of farmers and rural businesses whose total power requirements are close to this range and who are interested in the economic benefits of site dedicated, grid connected wind power.

Rather than delineate a narrow size range for customer sited commercial wind turbines or wind turbine developments, the group chose to regard customer profile as the factor that defines this market. The group agreed that the market for customer-sited commercial wind turbines involves two distinct customer profiles. One customer group invests in or owns a wind turbine to save on energy costs for their own operations, and the other group invests to sell the energy to the grid. Many characteristics of the overall market are held in common between the groups, while some are specific to each group. The tables below outline how the group distributes these characteristics.

	Market Motives:	
Market Channels and Actors	**Saving Energy Costs**	**Energy Production for Profit**
Farmers	X	X
Rural business owners	X	X
Rural land owners	X	X
Nonprofits/educational institutions	X	X

Motivations for Installing Mid-sized Wind Turbines in Wisconsin	**Saving Energy Costs**	**Energy Production for Profit**
Will save energy	X	
Contributes to energy independence	X	
Provides hedge against future raise in utility energy costs	X	X
Potential for green credits	X	X
Reduction of greenhouse gas emissions and other pollution avoidance	X	X
Financial return on investment		X
USDA Grant program and other financial incentives	X	X

Barriers to Development of Mid-sized Wind Projects in Wisconsin	**Saving Energy**	**Energy Production**

	Costs	for Profit
Buyback rates	X	X
Awareness level of zoning officials and local opposition	X	X
Initial system cost and availability of financing	X	X
Low capacity factor on smaller turbines	X	
Installation/maintenance infrastructure	X	
Shortage of available equipment (both new and remanufactured) – temporary	X	X
Lack of long-term and stable production tax credit		X
Availability of towers	X	
Non-uniform power purchase agreement processes	X	X
Hassle factor with regard to maintenance	X	
Lack of business models that reduce economic risk for farms and other businesses	X	X
Lack of cooperation/participation of rural electric cooperatives in development of customer sited commercial scale wind turbines.	X	X
Utility tariff structure that discourages excess wind energy production	X	
Public policy support at all levels of government	X	X

Program Approaches	**Saving Energy Costs**	**Energy Production for Profit**
Development of barrier reduction strategies:		
Create collaborative structure for addressing barriers	X	X
Develop uniform/transparent power purchase agreements	X	X
Virtual net metering	X	X
Uniform tariffs	X	X
Incentives:		
Raise incentive grants for larger turbines		X
State purchase of Renewable Energy Credits (RECs)	X	X
Renewable energy buy-back rate	X	X
Production tax incentive		X
Guaranteed loans	X	X
Business models:		
Set-aside for turbines under 2 megawatts	X	X
Energy savings model	X	
Investment venture model		X
Demonstrations of business models	X	X
Education/Public perceptions (NIMBY, zoning, public hearings	X	X

Additional Comments, Suggestions and Resources

1. At present, the two cutoff points in the rate structure are 75kW and 200kW

2. There are three categories of turbine installations:
    a. 20kW-100kW group – installations within this range will be affected by possible raising of the net metering maximum size limit. When the present limit was established, turbines were smaller. Other states have already raised the maximum to 100kW.
    b. 100kW and over – turbines that commercial but not necessarily utility owned or driven
    c. Utility-scale turbines – utility owned or contracted
3. Technology is advancing and turbine size is rapidly increasing. The standard, state of the art utility-scale turbine is now 1.5 megawatts. The remanufactured turbines now on the market at 35-90 kW were once the industry standard utility-scale turbines.
4. The four standard reasons for developing wind power are:
    a. Reliable power
    b. Clean Energy Center of Wisconsin environmental concerns
    c. Desire to invest in renewable Energy
5. Wind power is a relatively immature industry in terms of capitalization and infrastructure. There are only two commercial-scale installers in the state and they are both overworked and undercapitalized.
6. There is no surplus of equipment, and some sizes of turbines are built only on an as needed basis. These factors can slow project completion.
7. Virtual net metering – locating the actual tower in a remote location on the property where the wind resource is superior – uses two meters – use and production are reconciled
8. RPS – Can utility claim customer credits? Can net metered production be claimed by utilities? Can the RPS inspire a more beneficial buyback rate?
9. Check other states: Massachusetts is buying RECs on all renewables; Minnesota has a state buy-back rate; California has an accelerated depreciation tax credit for PV
10. Check out: *A Comparative Analysis of Community Wind Power Development Options in Oregon*, July 2004, Energy Trust of Oregon
11. Power purchase agreements are currently different with different utility reps (ask L Krom)
12. Three suggested data points:
    a. What we're doing now – what do we get for our money
    b. What's being done in other states – NY, California, Minnesota
    c. What's the perfect program, regardless of costs
13. Community wind: assess existing models in progress (Marks? Ask L Krom)
14. Assess the Minnesota model for a guaranteed loan program (escrow account? Realized as a payment or a tax credit?) Check DSIRE website
15. CESA is doing a small wind models study (D Wichert)